CONFIDENTIAL

File

998485

October 21, 1965

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25X1

Gentlemen:

SUBJECT: Contract

Enclosed herewith are two (2) copies of the progress report for the month of September 1965.

Very truly yours,

25X1

Contracts Manager

AKM:mja

cc: Project Engineer - 3 copies of report

Enclosures

EXCLUDED FROM AUTOMATIC RE-GRADING; DOD DIR 5200.10 DOES NOT APPLY

Declass Review by NGA.

CONFIDENTIAL

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October 21, 1965

[redacted] 25X1

25X1 [redacted]

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Very truly yours,

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cc: Project Engineer - 3 copies of report

Enclosures

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25X1 [redacted]

15 October 1965

Monthly Progress Report No. 3
for the Month of September

[redacted] 25X1

ELECTRONIC CIRCUITRY AND TEST

Design of a variable gamma control amplifier was cont'nued during the report period. Construction of the breadboard is approx'mately 80% complete and should be ready for testing early in October. The second-order modulator for geometric correction was tested on ARES. Cross-coupling and delay problems associated with the breadboard nature of the unit caused some difficulty in stability, however, the breadboard did produce the desired corrections. A more sophisticated approach is required to reduce the stability problems. This approach includes modifications to the present ARES which it is not now deemed feas'ble to make.

In connection with the work on the gamma amplifier, a circuit has been developed that is useful for manually controlled superimposition of two inputs, with an output equal to the sum of the two with the amplitude maintained constant. The circuit has also been tested with a switching signal to produce flicker between the two inputs.

A logarithmic amplifier using a controlled conductance d'ode as the non-linear load has been breadboarded. The manufacturer of the d'ode claims a logarithmic relationship between the 'nput current and the voltage across the diode over a range of 1000 to 1. Our tests, while not yet complete, tend to corroborate this.

Work on the formulation of a design for a prototype image integration viewer is continuing. A block diagram of a proposed system has been laid out and an analysis of the functional units started.

Because of the nature of some of the problems that we have encountered and the time required to solve them, we believe that it will be necessary to work for an additional two weeks before issuance of the final report, which is now scheduled for the end of October.

A Mathematical Model for Superimposition

During the past month, the following aspects of a mathematical model for N superimposed photographic noncoherent inputs have been examined:

A. Image Displacements with Various Types of Oblique Photography

The effect of tilt and scan angle on second order distortion was examined in an effort to obtain maximum scan angles or usable mm of film before reaching a critical degree of second order distortion. At present the study is continuing and results will appear in the final report.

B. Superimposition and Signal to Noise Ratios

The effect of superimposition for N negatives on the final signal to noise ratio was examined both for similar and non-similar negatives. Except for varying constants, it was found that the signal to noise ratio varied with the square root of the number of negatives used.

C. Superimposition and Modulation Transfer Function

It was found that in superimposition the MTF's are additive but superimposition error also under study generates phase shifts which alter the result.

D. Weighting Considerations

Under this portion of the study, attempts have been made to determine the relationship between signal to noise ratio, MTF, superimposition error, and the final resultant MTF. A relationship has been established which shows that as the sum of the transfer functions increase and as the S/N ratio increases, high frequency detail improves in contrast. The final MTF, however, is degraded by super-imposition errors. Tolerable errors in superimposition are still under study.

A bibliography of reports concerning transformation theory, Fourier analysis, superimposition studies, modulation transfer studies, modulation transfer studies, and signal to noise ratio studies has been compiled.

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15 October 1965

The contractor certifies herein that he has completed no less than 59% of Phase I of this contract.

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BCA:dm